

IAF SPACE PROPULSION SYMPOSIUM (C4)  
Interactive Presentations - IAF SPACE PROPULSION SYMPOSIUM (IP)

Author: Mr. Nick Salamon

The Ohio State University College of Engineering, United States, salamon.31@osu.edu

Dr. John M. Horack

The Ohio State University College of Engineering, United States, horack.1@osu.edu

OVERVIEW OF RESEARCH ON NUCLEAR THERMAL ROCKET NOZZLES AT OSU

**Abstract**

Nuclear thermal rockets are a promising in-space propulsion technology offering higher efficiencies than conventional chemical rockets. Before this technology can be taken advantage of, however, it must undergo extensive ground testing and evaluation to ensure that every component can withstand multiple burns at maximum temperatures around 2700 Kelvin. Research on nuclear thermal rocket components is currently under way at The Ohio State University, and this paper provides an overview of the work being done as well as preliminary experimental results. Topics covered include the process of creating regeneratively cooled rocket nozzle prototypes via additive manufacturing, and a discussion of the various experimental approaches used to quantify component performance. These include cold flow testing, hot flow testing, thermal cycling, and radiation exposure testing. Approaches to materials characterization such as tensile testing and electron microscopy are covered. Finally, an overview of computational approaches and how they compare to preliminary experimental results is given.